Brüel & Kjær

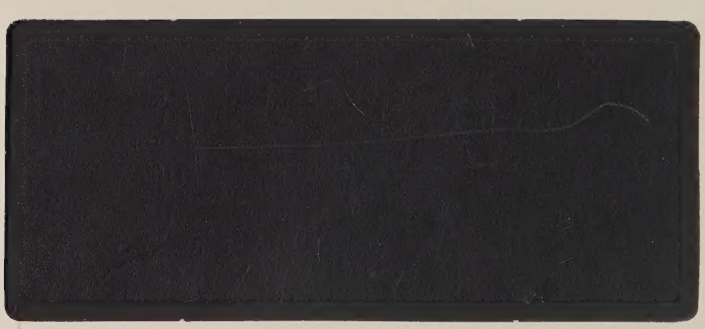
STABRO

2513
Integrating Vibration Meter

Valid from serial no. 842 642

037-384

Service



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Consisting of:

	page	date
Service Instruction	0–1	6.81
- -	0–2	6.81
Checking Procedure	1–1	6.81
Adjustment Procedure	2–1	6.81
- -	2–3	6.81
Mechanical Parts	3–1	6.81
ZE 0339	1	8.80
-	3	8.80
-	4	8.80
-	5	8.80

Trouble Shooting

If any faults should occur please check the instrument according to the Checking Procedure.

When a fault has been traced and corrected, the voltages and adjustments influenced by the correction must be rechecked. The complete instrument should then be tested to make sure that all basic functions are operative.

The tolerances given in these notes are intended for use as guide for adjustments.

Before correcting any apparent deviation make sure that the measuring instrument has tolerances small enough not to affect the measurement.

Modifications

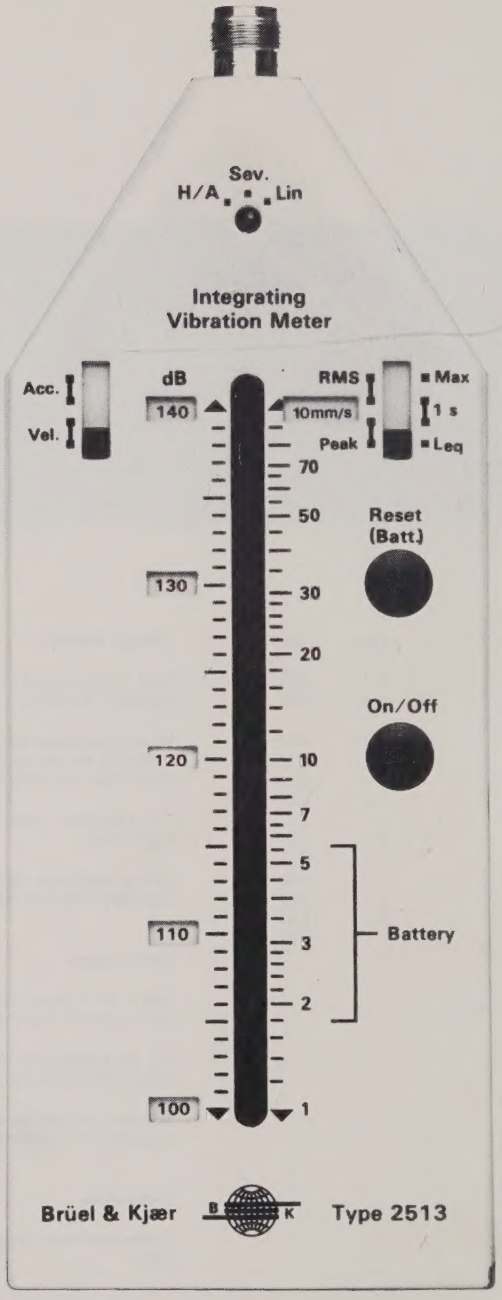
Due to the constant technical progress the instrument will be modified from time to time in order to provede continously improved performance.

For this reason there may be small differencies between the instrument and the Service Instruction.

However, the local Representative Service is in possesion of all information regarding the modifications that have been made.

Spare Parts

Please state type and serial number of the instrument when ordering spare parts.

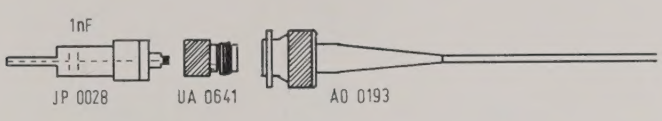

Sev.
H/A
Lin
Integrating
Vibration Meter
Acc.
Vel.
dB
140
130
120
110
100
RMS
10mm/s
Peak
Max
1 s
Leq
70
50
30
20
10
7
5
3
2
1
Reset
(Batt.)
On/Off
Battery
Brüel & Kjær
Type 2513

Type 2513 will automatically switch off two minutes after it has been switched on if none of the switches have been operated. In order to facilitate checking and adjustment, this function can be eliminated by plugging a JP 0213 into the AC OUTPUT Socket. At the same time the L_{eq} function is not working.

Battery Check

Push (BATT.)

Check that the display lights up within "Battery" range.



Sensitivity
ON/OFF:"On"
"Acc.","160 dB"
"RMS, 1 s"
"Lin"

Input signal: 100 mV, 500 Hz, through a 1 nF capacitor.
(JP 0028 with a build-in CG 0001 glass capacitor, standard acessory adaptor and cable UA 0641 and AO 0193 respectively.)

Check that the display indicates 160 dB.

Check the AC output: 1 V ± 5%. (Remove output plug after measurement).

Detector Linearity

Input signal: 10 mV, 500 Hz.
Check that the display indicates 140 dB.

Input signal: 1 mV, 500 Hz.
Check that the display indicates 120 dB.

RMS Hold
"RMS, Max."

Input signal: 10 mV, 500 Hz.
Shortly (2 s) increase the input voltage 10 dB.

Check that the display reading holds 150 dB.
(Decay time ± 0,5 dB/min.)

Activate RESET.

Peak
"Peak, 1 s"

Check that the display reading increases 3 dB ~ 143 dB.

L_{eq}
"Peak L_{eq}"

Activate RESET.

Check that the display flashes during the measurement (60 s).

Check that the display holds the measured ressult (140 dB) and switches off the instrument after a periode of 60 s.

Weighting Network
ON/OFF to "On"
"RMS, 1 s"

Check the frequency response.
10 Hz to 10 kHz: 140 ± 3 dB.

"Sev."

10 Hz to 1 kHz: 140 ± 3 dB.

"H/A"

10 Hz to 1 kHz: 140 ± 3 dB.

Velocity
"Lin"
"Vel", "160 dB"

Input signal: 100 mV, 500 Hz.
Check that the display indicates 150 dB

Change the input frequency to 2 kHz.
Check that the display decreases to 138 dB.

Overload

Input signal: 1 V, 500 Hz.
Check that display reading flashes at 160 dB.

Noise
"Vel.", "140 dB"

Short circuit the input at the 1 nF capacitor to ground.

Check that the reading is below the bottom of the scale

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https://archive.org/details/manualsplus_09882

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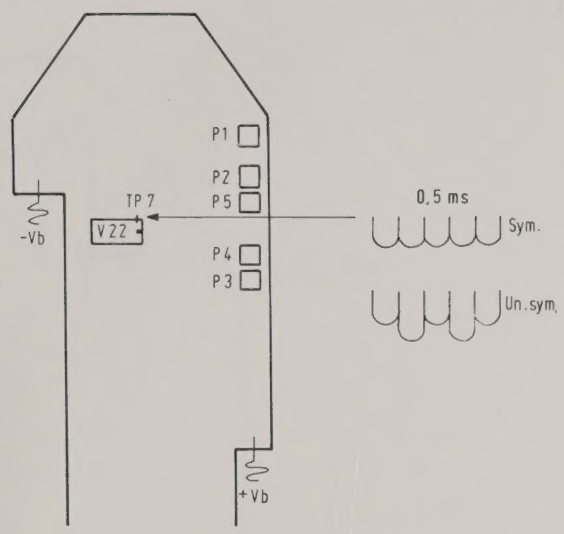


Detector
"Sev."
"Acc.,180 dB"
"Peak,L_{eq}"

Input signal: 100 mV, 1 kHz.

Activate ON.

Connect an oscilloscope to TP 7, check curves as shown.
If unsymmetrical adjust P 1.

L_{eq}

Input signal: 560 mV (equal to 5 dB below full scale defl.), 160 Hz.

Activate ON and RESET.

Check L_{eq} deflection (the lower of the two indications) when measurement has stopped after one minute: 175 dB.
If necessary adfjust P 5.

Input signal: 18 mV (35 dB below full scale defl.), 160 Hz.

Activate ON and RESET.

Check L_{eq} deflection after one minute: 145 dB.
If necessary adjust P 3.

The adjustments influence each other i.e. if one adjustment has been made the other must be readjusted.

Also the instrument must be screened during adjustment.

Peak
"Peak 1 s"

Input signal: 400 mV (5 dB below full scale defl.) 160 Hz.

Activate ON and RESET.

Check Peak deflection: 175 dB.
If necessary adjust P 4.

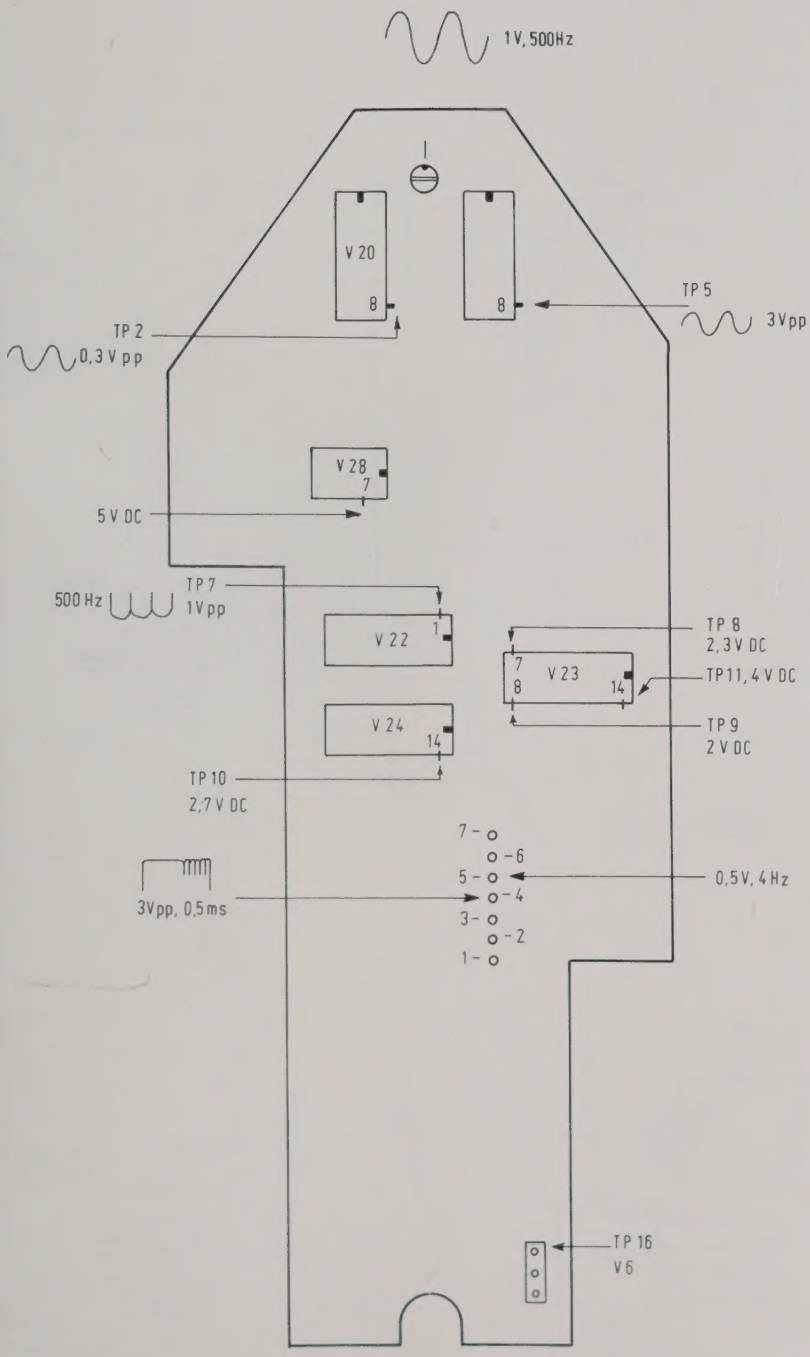
Input signal 13 mV (35 dB below full scale defl.), 160 Hz.

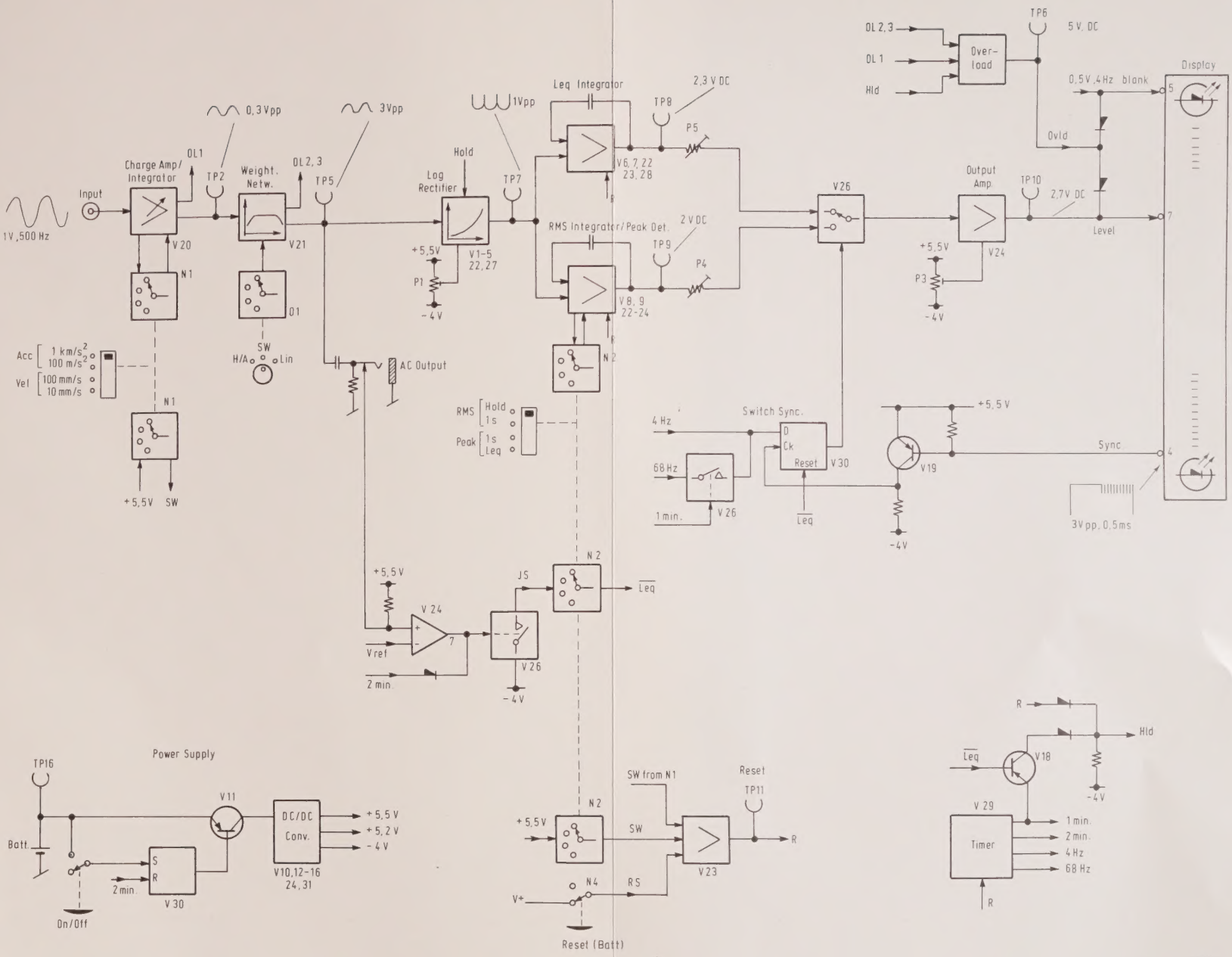
Activate ON and RESET.

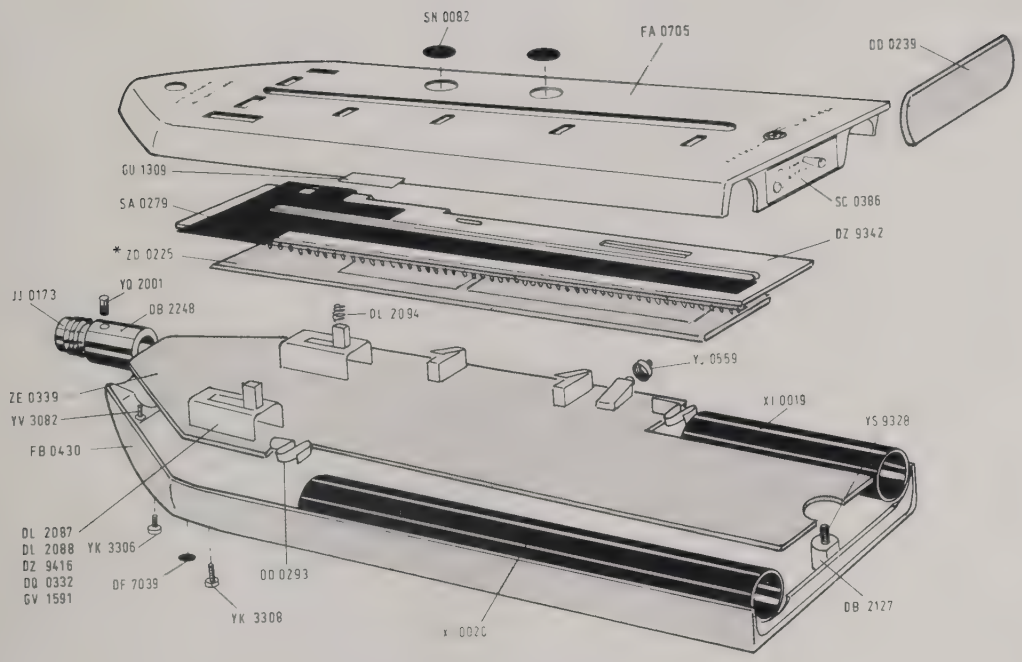
Check Peak deflection: 145 dB.
If necessary adjust P 2.

The adjustments influence each other i.e. if one adjustment has been made the other must be readjusted.

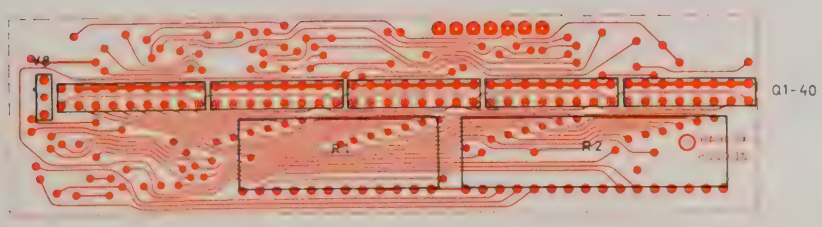
Also the instrument must be screened during adjustment.


1 V, 500 Hz
V 20
8
8
TP 5
3 Vpp
TP 2
0,3 V pp
V 28
7
5 V DC
500 Hz
TP 7
1 Vpp
V 22
1
TP 8
2,3 V DC
7
8
V 23
14
TP 11, 4 V DC
V 24
14
TP 9
2 V DC
TP 10
2,7 V DC
7
6
5
4
3
2
1
3 Vpp, 0,5 ms
0,5 V, 4 Hz
TP 16
V 6


1V, 500 Hz
Input
Charge Amp/ Integrator
OL1
TP2
0,3Vpp
Weight. Netw.
OL2, 3
TP5
3Vpp
1Vpp
Hold
Log Rectifier
TP7
Leq Integrator
TP8
2,3 V DC
P5
V6, 7, 22 23, 28
RMS Integrator/Peak Det.
TP9
2 V DC
P4
V8, 9 22-24
V26
Output Amp.
TP10
2,7 V DC
Level
Display
0,5 V, 4Hz blank
Ovld
OL 2, 3
OL 1
Hld
Over-load
TP6
5 V. DC
V20
V21
N1
Q1
V24
P3
P1
+5,5V
-4V
V1-5 22, 27
Acc
1 km/s²
100 m/s²
Vel
100 mm/s
10 mm/s
SW
H/A
Lin
AC Output
RMS
Hold
1s
Peak
1s
Leq
N2
Switch Sync.
4 Hz
68 Hz
1 min.
V26
D
Ck
Reset
V30
Leq
V19
+5,5 V
Sync.
3Vpp, 0,5ms
-4V
+5,5 V
V24
Vref
2 min.
J5
N2
Leq
V26
-4V
Power Supply
TP16
Batt.
On/Off
2 min.
S
R
V30
V11
DC/DC Conv.
V10,12-16 24,31
+5,5 V
+5,2 V
-4 V
+5,5V
N2
SW from N1
SW
Reset
TP11
V23
R
N4
RS
V+
Reset (Batt)
R
Hld
Leq
V18
-4V
V29
Timer
1 min.
2 min.
4 Hz
68 Hz
R
2513.2



*** ZD 0225 Display Board**



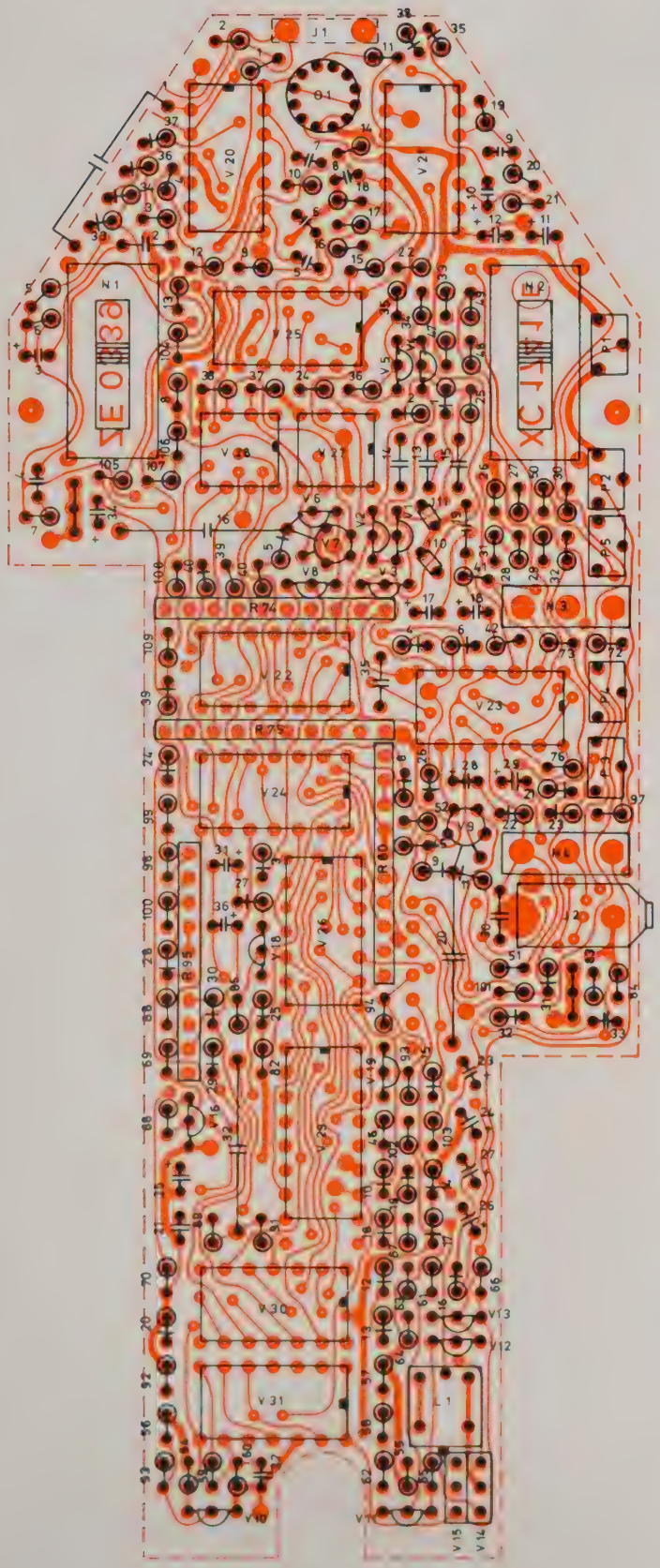
Viewed from the component side

Q 1-40	LED TIL 261-268	QV 4007
R 1	Thickfilm	RZ 0058
R 2	-	RZ 0057
V 8	Phototransistor BPX81/II	VB 3505
	Print with Chips	ZE 0266

2513

ZE 0339

LAYOUT DIAGRAM



PARTS LIST

C 1	Polystyrene	1%	10 nF/ 63 V	CT 1545
C 2	Ceramic	5%	10 pF/400 V	CK 1100
C 3	Tantalum		10 µF/ 35 V	CF 0064
C 4-7	Polystyrene	1%	3,9 nF/ 63 V	CT 1537
C 8-10	-	1%	1 nF/ 63 V	CT 1132
C 11,12	Tantalum		33 µF/ 10 V	CF 0034
C 13	Ceramic	5%	10 pF/400 V	CK 1100
C 14	-		4,7 pF/400 V	CK 0470
C 15	-		220 pF/400 V	CK 2222
C 16	Polycarbonate		220 nF/100 V	CS 0339
C 17,18	Tantalum		1,5 µF/ 35 V	CT 0008
C 19	Ceramic		100 pF/400 V	CK 2103
C 20	Polycarbonate		220 nF/100 V	CS 0339
C 21,22	Ceramic		1 nF/ 63 V	CK 3102
C 23,24	Tantalum		33 µF/ 10 V	CF 0034
C 25	-		3,3 µF/ 16 V	CF 0014
C 26,27	-		33 µF/ 10 V	CF 0034
C 28	-		2,2 µF/ 35 V	CF 0022
C 29	-		0,33 µF/ 35 V	CF 0067
C 30	Ceramic		10 nF/ 30 V	CK 4101
C 31	Tantalum		1 µF/ 35 V	CF 0062
C 32	Polycarbonate		220 nF/100 V	CS 0339
C 33	Ceramic		1 nF/ 63 V	CK 3102
C 34	Tantalum		4,7 µF/ 35 V	CF 0051
C 35	Ceramic		100 pF/400 V	CK 2103
C 36	Tantalum		0,1 µF/ 35 V	CF 0049

J 1	"Input"	JJ 0173
J 2	"AC — Output"	JJ 0211

L 1	Coil	LB 0923

N 1,2	ACC. -VEL./RMS, Peak Switch	DL 2087 + DL 2088 + DZ 9416 + DQ 0332 + GV 1591
N 3,4	ON—OFF/RESET	NT 0041

O 1	H/A — Sev. — Lin.	OI 0038

P 1,2	Cermet 500 kΩ	PG 4514
P 3-5	- 50 kΩ	PG 3517

Q 1 3	Si.	1N4148	75 V/75 mA	QV 0216
Q 4,5		ITT3007	150 V/200 mA	QV 0242
Q 6		1N4148	75 V/75 mA	QV 0216
Q 8	-	1N4148	75 V/75 mA	QV 0216
Q 9-11	-	ITT3007	150 V/200 mA	QV 0242
Q 12	-	1N4148	75 V/75 mA	QV 0216
Q 13	Ge.	OA47	25 V/110 mA	QV 0094
Q 14-16	Si.	1N4148	75 V/75 mA	QV 0216
Q 17	Ze.	BZX79B5V6	5,5-5,7 V/0,4 W	QV 1369
Q 18,19	Si.	1N4148	75 V/75 mA	QV 0216
Q 20	Ge.	OA47	25 V/110 mA	QV 0094
Q 21,40	Si.	1N4148	75 V/75 mA	QV 0216

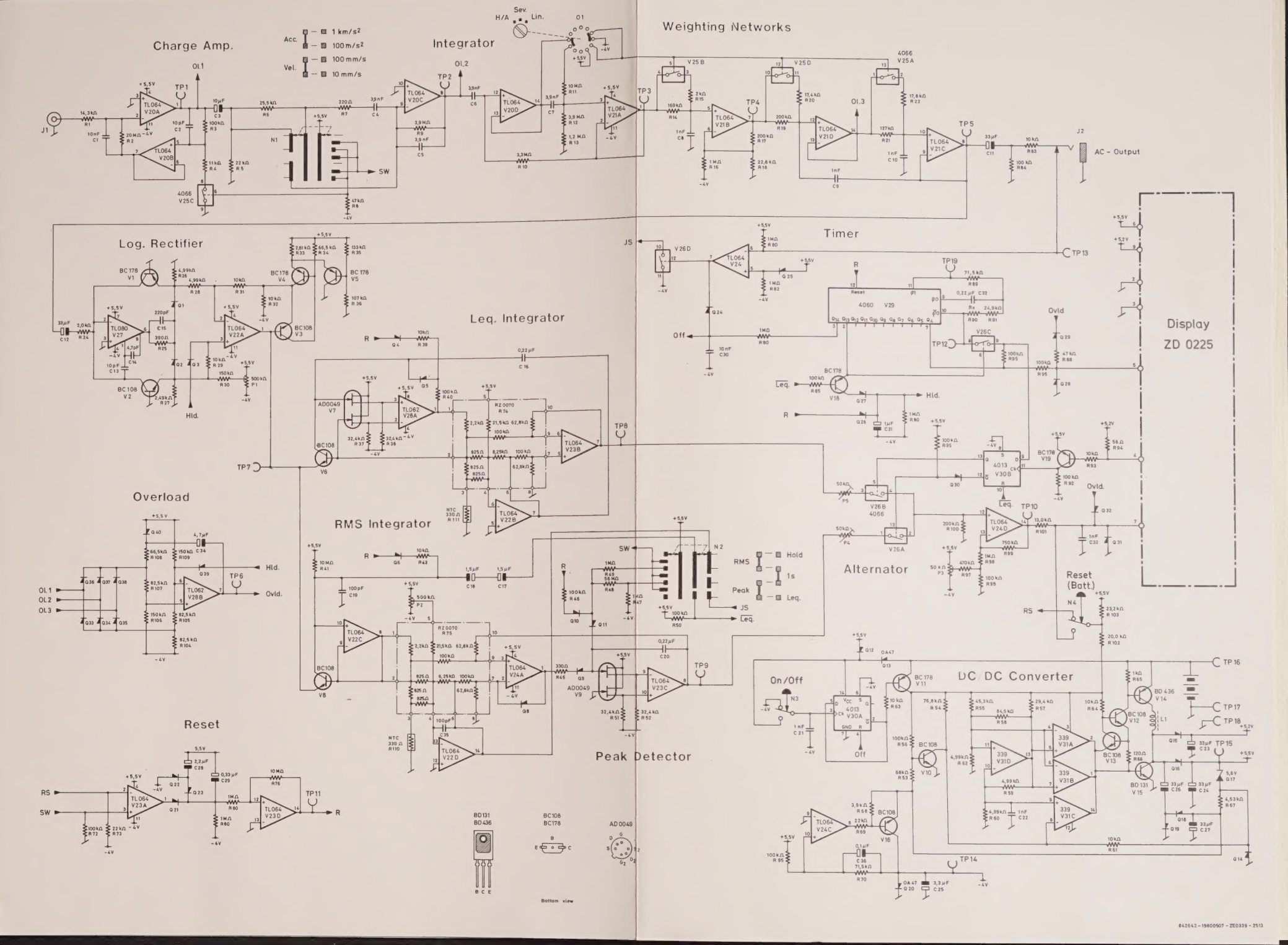
R 1	Metal	1/4 W	1%	14,3 kΩ	RF 4143
R 2	Carbon	-	5%	20 MΩ	RH 0903
R 3	Metal	-	1%	100 kΩ	RF 5100
R 4			-	11,0 kΩ	RF 4110
R 5	Carbon		5%	22 kΩ	RB 4220
R 6	Metal	-	1%	25,5 kΩ	RF 4255
R 7	Carbon	-	5%	220 Ω	RB 2220
R 8				47 kΩ	RB 4470
R 9	Carbon	1/4 W	5%	3,9 MΩ	RB 6390
R 10	-	-	-	3,3 MΩ	RB 6330
R 11	-	-	-	10 MΩ	RH 7100
R 12	-	-	-	3,9 MΩ	RB 6390
R 13	-	-	10%	1,2 MΩ	RB 6120
R 14	Metal	-	1%	169 kΩ	RF 5169
R 15	-	-	-	2,00 kΩ	RF 3200
R 16	-	1/8 W	-	1,00 MΩ	RF 6100
R 17	-	1/4 W	-	200 kΩ	RF 5200
R 18		-	-	22,6 kΩ	RF 4226
R 19	-	-	-	200 kΩ	RF 5200
R 20	-	-	-	17,4 kΩ	RF 4174
R 21	-	-	-	127 kΩ	RF 5127
R 22	-	-	-	17,8 kΩ	RF 4178
R 24	-	-	-	2,00 kΩ	RF 3200
R 25	Carbon	-	5%	330 Ω	RB 2330
R 26	Metal	-	1%	4,99 kΩ	RF 3499
R 27	-	-	-	2,49 kΩ	RF 3249
R 28	-	-	-	4,99 kΩ	RF 3499
R 29	Carbon	-	5%	10 kΩ	RB 4100
R 30	-	-	-	150 kΩ	RB 5150
R 31,32	Metal	-	1%	10,0 kΩ	RF 4100
R 33	-	-	-	2,61 kΩ	RF 3261
R 34		-	-	66,5 kΩ	RF 4665
R 35	-	-	-	133 kΩ	RF 5133
R 36	-	-	-	107 kΩ	RF 5107
R 37,38	-	-	-	32,4 kΩ	RF 4324
R 39	Carbon	-	5%	10 kΩ	RB 4100
R 40	-	-	-	100 kΩ	RB 5100
R 41	-	-	-	10 MΩ	RH 7100
R 42		-		10 kΩ	RB 4100
R 45	-	-		330 Ω	RB 2330
R 46	-	-	-	100 kΩ	RB 5100
R 47	-	-	-	1 MΩ	RB 6100
R 48	-	-	10%	56 MΩ	RH 0913
R 49	-	-	5%	1 MΩ	RB 6100
R 50			-	100 kΩ	RB 5100
R 51,52	Metal		1%	32,4 kΩ	RF 4324
R 53	Carbon	-	5%	68 kΩ	RB 4680
R 54	Metal	-	1%	76,8 kΩ	RF 4768
R 55	-	-		45,3 kΩ	RF 4453
R 56	Carbon		5%	100 kΩ	RB 5100
R 57	Metal		1%	29,4 kΩ	RF 4294
R 58		-	-	84,5 kΩ	RF 4845
R 59,60	-	-		4,99 kΩ	RF 3499
R 61	-	-	-	10,0 kΩ	RF 4100
R 62				4,99 kΩ	RF 3499
R 63,64	Carbon	-	5%	10 kΩ	RB 4100
R 65				1 kΩ	RB 3100
R 66				120 Ω	RB 2120
R 67	Metal		1%	4,53 kΩ	RF 3453
R 68	Carbon		5%	3,9 kΩ	RB 3390
R 69				22 kΩ	RB 4220
R 70	Metal		1%	71,5 kΩ	RF 4715
R 72				100 kΩ	RF 5100
R 73	Carbon		5%	22 kΩ	RB 4220
R 74,75	Thickfilm				RZ 0070
R 76	Carbon	1/4 W	5%	10 MΩ	RH 7100
R 80	Thickfilm				RZ 6610
R 82	Carbon	1/4 W	5%	1 MΩ	RB 6100
R 83				10 kΩ	RB 4100
R 84,85				100 kΩ	RB 5100
R 88				47 kΩ	RB 4470
R 89	Metal		1%	71,5 kΩ	RF 4715
R 91				24,9 kΩ	RF 4249
R 92	Carbon		5%	100 kΩ	RB 5100
R 93				10 kΩ	RB 4100
R 94				56 Ω	RB 1560
R 95	Thickfilm				RZ 6510

PARTS LIST

R 97	Carbon	1/4 W	5%	470 kΩ	RB 5470
R 98	Metal	1/8 W	1%	1,00 MΩ	RF 6100
R 99	-	1/4 W	-	750 kΩ	RF 5750
R 100	-	-	-	200 kΩ	RF 5200
R 101	-	-	-	13,0 kΩ	RF 4130
R 102	-	-	-	20,0 kΩ	RF 4200
R 103	-	-	-	23,2 kΩ	RF 4232
R 104,105	-	-	-	82,5 kΩ	RF 4825
R 106	-	-	-	150 kΩ	RF 5150
R 107	-	-	-	82,5 kΩ	RF 4825
R 108	-	-	-	66,5 kΩ	RF 4665
R 109	-	-	-	150 kΩ	RF 5150
R 110,111	Carbon	0,5 W	5%	330 Ω	RN 0022

V 1	Silicon	PNP	BC178	VB 0126
V 2,3	-	NPN	BC108	VB 0592
V 4,5	-	PNP	BC178	VB 0126
V 6	-	NPN	BC108	VB 0592
V 7	Dual FET	N	AD0049	VB 1048
V 8	Silicon	NPN	BC108	VB 0592
V 9			AD0049	VB 1048
V 10	Silicon	NPN	BC108	VB 0592
V 11	-	PNP	BC178	VB 0126
V 12,13	-	NPN	BC108	VB 0592
V 14	-	PNP	BD436	VB 0120
V 15	-	NPN	BD0131	VB 0593
V 16	-	NPN	BC108	VB 0592
V 18,19	-	PNP	BC178	VB 0126
V 20-24	4 × Op. Amp.		TL064	VE 0151
V 25,26	4 × Bilateral Switch		CD4066	VD 2008
V 27	Op. Amp.		TL080	VE 0161
V 28	2 × Op. Amp.		TL062	VE 0136
V 29	14 Stage Count./Div.and Osc.		CD4060	VD 2064
V 30	2 × Set/Reset D Flip-Flop		CD4013	VD 2006
V 31	4 × Comparator		LM339	VE 0110

14-pin Socket	JJ 1408
16-pin Socket	JJ 1622
18-pin Socket	JJ 1809
7-pin Plug	OD 0294
Printed Circuit Board	XC 1741


Charge Amp.
Acc.
1 km/s²
100 m/s²
Vel.
100 mm/s
10 mm/s
Integrator
H/A
Sev.
Lin.
Weighting Networks
Log. Rectifier
Leq. Integrator
Timer
Display
ZD 0225
Overload
RMS Integrator
Alternator
Reset
Reset (Batt.)
On/Off
DC DC Converter
Peak Detector
AC - Output
Hold
1s
Peak
Leq.
RMS
JS
Hld.
Ovld.
Off
SW
RS
BD131
BD436
BC108
BC178
AD0049
Bottom view
842642 - 19800507 - ZE0339 - 2513